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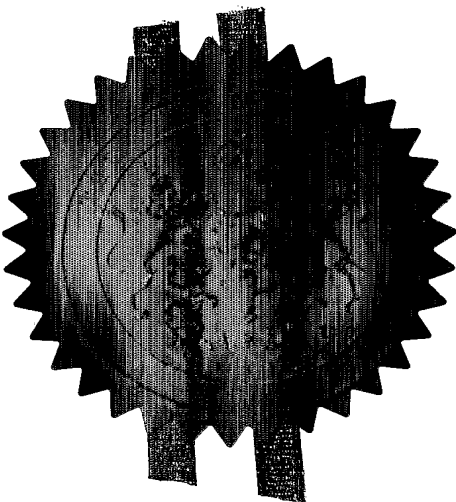
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29MAR04 EBB4631-1 002481  
P01/7700 0:00-0406992.8 NONE

## Request for grant of a patent

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The Patent Office

Cardiff Road  
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1. Your reference P365631/LBA/GMU

2. Patent application number 0406992.8 27 MAR 2004  
(The Patent Office will fill this part in)

3. Full name, address and postcode of the or of each applicant (underline all surnames) Rocep Lusol Holdings Limited  
Rocep Business Park  
Rocep Drive  
Renfrew, PA4 8XY

Patents ADP number (if you know it)

6837694002

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

4. Title of the invention "Apparatus for Controlling Flow Rate from a Tilttable Valve Dispenser"

5. Name of your agent (if you have one) Murgitroyd & Company  
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode) 165-169 Scotland Street  
Glasgow  
G5 8PL

Patents ADP number (if you know it)

1198015 ✓

6. Priority: Complete this section if you are declaring priority from one or more earlier patent applications, filed in the last 12 months.	Country United Kingdom	Priority application number (if you know it)	Date of filing (day / month / year)
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7. Divisionals, etc: Complete this section only if this application is a divisional application or resulted from an entitlement dispute (see note d)	Number of earlier UK application	Date of filing (day / month / year)
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8. Is a Patents Form 7/77 (Statement of inventorship and of right to grant of a patent) required in support of this request? Yes

Answer YES if:

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- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

Otherwise answer NO (See note d)

# Patents Form 1/77

9. Accompanying documents: A patent application must include a description of the invention. Not counting duplicates, please enter the number of pages of each item accompanying this form:

Continuation sheets of this form

Description 14 ✓

Claim(s) -

Abstract -

Drawing(s) 4 1 4 5 ✓

10. If you are also filing any of the following, state how many against each item.

Priority documents -

Translations of priority documents -

Statement of inventorship and right to grant of a patent (Patents Form 7/77) -

Request for a preliminary examination and search (Patents Form 9/77) -

Request for a substantive examination (Patents Form 10/77) -

Any other documents (please specify) -

11. I/We request the grant of a patent on the basis of this application.

Signature(s)

*Graham Murnane* Date 26/03/2004

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

GRAHAM MURNANE

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1     **APPARATUS FOR CONTROLLING FLOW RATE FROM A TILTABLE**  
2     **VALVE DISPENSER**

3

4     This invention relates to dispensing apparatus and  
5     to a user operated valve assembly for use with a  
6     dispensing apparatus. Particularly, but not  
7     exclusively it relates to a dispensing apparatus and  
8     valve assembly for dispensing viscous materials from  
9     a container under pressure of a propellant.

10

11    It is known to provide a dispensing apparatus which  
12    includes a tilt valve mechanism fitted to a  
13    container filled with a product, for example mastic  
14    or sealant, which is to be dispensed. The user  
15    pushes the valve stem to one side to open the valve  
16    and dispense product from the pressurised container.  
17    However such dispensers are intended for use only in  
18    situations where a full flow of product is required.  
19    There is no intermediate setting of the valve which  
20    permits an intermediate flow rate, and it can be  
21    difficult to ensure a steady stream of flow unless  
22    the valve is fully open.

1

2 It is an object of the present invention to provide  
3 a dispensing apparatus which overcomes one or more  
4 of the above disadvantages.

5

6 According to a first aspect of the present invention  
7 there is provided a valve assembly for use with a  
8 dispensing apparatus, the valve assembly comprising:

9 a tilt valve including a valve stem;

10 a lever coupled to the valve stem;

11 variable spacer means arranged to limit the  
12 travel of the lever by a variable amount according  
13 to the relative position of the lever and the  
14 variable spacer means.

15

16 Preferably the variable spacer means is adapted to  
17 prevent travel of the lever in a particular relative  
18 position of the lever and the variable spacer means.  
19 In this position the lever cannot be operated so  
20 that the valve is effectively locked in a closed  
21 position.

22

23 Preferably the valve assembly includes a nozzle.

24 Preferably the lever is integral with the nozzle.

25 Preferably the nozzle is sealingly engaged with the  
26 valve stem.

27

28 Preferably the variable spacer means includes a  
29 plurality of spacer portions of differing thickness,  
30 each spacer portion being arranged to limit the  
31 travel of the lever by a predetermined amount. One  
32 spacer portion may be arranged to allow a full range

1 of travel of the lever so that by pressing the lever,  
2 fully the valve is fully opened. Another spacer  
3 portion may be arranged to allow a partial range of  
4 travel of the lever so that by pressing the lever  
5 fully the valve is opened to an intermediate flow  
6 setting. Further spacer portions may be arranged to  
7 provide further intermediate flow settings.

8  
9 Alternatively the variable spacer means may comprise  
10 a cam surface arranged to limit the travel of the  
11 lever by an amount which varies with the relative  
12 position of the lever and the variable spacer means.  
13 This allows the user of the valve assembly infinite  
14 adjustment of the flow rate by selecting a  
15 particular relative position of the lever and the  
16 variable spacer means.

17  
18 In a first preferred embodiment the variable spacer  
19 means comprises a collar which in use engages with a  
20 container with which the valve assembly is used.

21  
22 Preferably the spacer portions comprise a plurality  
23 of portions of the collar of different height  
24 adapted to contact the lever when the lever is at  
25 the limit of its travel. Preferably the lever is  
26 rotatably mounted relative to the valve so that in  
27 use the lever is rotated to select a required limit  
28 of travel of the lever and hence a required flow  
29 setting of the valve. The collar may be provided  
30 with markings to indicate the flow setting  
31 associated with each portion of the collar.

32



1 Preferably the collar is adapted to press fit on the  
2 rolled flange of a standard pressurised container.

3

4 In a second preferred embodiment the variable spacer  
5 means comprises a collar rotatably mounted around  
6 the valve stem beneath lever.

7

8 Preferably the spacer portions comprise a plurality  
9 of portions of the collar of different thickness  
10 adapted to space the lever from the container with  
11 which the valve assembly is used when the lever is  
12 at the limit of its travel. Preferably the collar  
13 is rotatably mounted relative to the valve so that  
14 in use the collar is rotated to select a required  
15 limit of travel of the lever and hence a required  
16 flow setting of the valve. The collar may be  
17 provided with markings to indicate the flow setting  
18 associated with each portion of the collar.  
19 Alternatively the lever could be rotated relative to  
20 the valve and the collar fixed.

21

22 Preferably the collar is in the form of a clip  
23 having a radial slot. In this way the collar can be  
24 readily fixed to a valve stem with a lever already  
25 in place.

26

27 Preferably the collar is mounted on a portion of the  
28 nozzle which extends below the lever. This allows  
29 the nozzle, lever and collar to be pre-assembled as  
30 a nozzle assembly which can then be snap fitted onto  
31 the valve stem of a tilt valve at any stage in the  
32 manufacturing process.

1  
2 Preferably the collar is arranged to engage the  
3 rolled flange of a container with which the valve  
4 assembly is used when the lever is at the limit of  
5 its travel.

6  
7 In a third preferred embodiment the nozzle serves as  
8 the lever. Alternatively the lever is provided  
9 between the nozzle and the valve stem and is  
10 substantially axially aligned with the valve stem.  
11 Preferably the variable spacer means is arranged to  
12 limit the lateral travel of the nozzle or lever by a  
13 variable amount according to the direction in which  
14 the nozzle or lever is displaced.

15  
16 Preferably the spacer means comprises a collar which  
17 in use engages with a container with which the valve  
18 assembly is used.

19  
20 Preferably the variable spacer means comprise a  
21 plurality of spacer portions. Preferably the spacer  
22 portions comprise a plurality of recessed portions  
23 of the collar of different depths adapted to contact  
24 the nozzle or lever when the nozzle or lever is  
25 displaced towards said recessed portion. Each  
26 recessed portion provides a different limit of  
27 travel of the nozzle or lever and thus corresponds  
28 to a different flow setting of the valve assembly.

29  
30 Alternatively the variable spacer means may comprise  
31 a cam surface of the collar adapted to contact the  
32 nozzle or lever when the nozzle or lever is

1 displaced laterally and provide a limit of travel,  
2 the limit of travel varying with the direction in  
3 which the nozzle or lever is displaced.

4

5 The collar may include a sleeve substantially  
6 surrounding the valve stem. The collar may be  
7 provided with markings to indicate the flow setting  
8 associated with each recessed portion.

9

10 Preferably the collar is adapted to press fit on the  
11 rolled flange of a standard pressurised container.

12

13 According to a second aspect of the present  
14 invention there is provided a dispensing apparatus  
15 comprising a container and a valve assembly  
16 according to the first aspect.

17

18 Preferably the apparatus comprises means for urging  
19 the product from the container. Preferably the  
20 container is pressurised. The container may contain  
21 a propellant. The container may contain a piston,  
22 situated between the propellant and the valve.

23

24 Preferably the valve assembly comprises a mounting  
25 cup adapted to secure the valve to the container.  
26 Preferably the container is provided with a rolled  
27 flange portion and the mounting cup is provided with  
28 a corresponding flange portion adapted to engage  
29 with the rolled flange portion of the container.

30

1 Specific embodiments of the invention will now be  
2 described, by way of example only, with reference to  
3 the accompanying drawings in which:

4

5 Fig. 1 shows a collar of a valve assembly  
6 according to the invention;

7

8 Fig. 2 shows a section through a valve assembly  
9 including the collar of Fig. 1 with the lever in a  
10 primed position and the valve closed;

11

12 Fig. 3 shows a section through the valve  
13 assembly of Fig. 2 with the collar in an  
14 intermediate flow position and the lever at the  
15 limit of its travel with the valve opened to an  
16 intermediate flow setting;

17

18 Fig. 4 shows a section through the valve  
19 assembly of Fig. 2 with the collar in a full flow  
20 position and the lever at the limit of its travel  
21 with the valve fully open;

22

23 Fig. 5 shows a section through another valve  
24 assembly according to the invention before  
25 attachment of the collar with the lever in a primed  
26 position and the valve closed;

27

28 Fig. 6 shows a section through the valve  
29 assembly of Fig. 5 with the collar attached in an  
30 intermediate flow position and the lever at the  
31 limit of its travel with the valve opened to an  
32 intermediate flow setting;

Fig. 7 shows a section through the valve assembly of Fig. 5 with the collar attached in a full flow position and the lever at the limit of its travel with the valve fully open;

Fig. 8 shows an exploded view of another valve assembly according to the invention;

Fig. 9 shows the valve assembly of Fig. 8 in an assembled state; and

Fig. 10 shows a section through the valve assembly of Fig. 8.

Referring to Figs. 1 to 4 of the accompanying drawings, there is disclosed a valve assembly 10 fitted on a container 12 to form a dispensing apparatus 11. In this example, the container 12 is an aluminium monoblock container of the sort widely used in aerosol applications. It is envisaged that the can 12 could be of tin plate, steel or any conventional can construction having a standard one inch (25 mm) hole in the top. The can may be internally lacquered. However the valve assembly of the present invention can be used with a container 12 of any material holding a pressurised product, for example a container of plastic, glass or metal.

The valve assembly 10 includes a valve 14, a nozzle assembly 16, a lever 18 and a collar 20 secured to the container 12. The valve is a tilt valve of the

1 type widely used in pressurised dispensers and  
2 operated by tilting the valve stem 30. The valve  
3 stem 30 is a hollow plastic tube with apertures 32  
4 in the tube wall at the lower end. The upper end 34  
5 is open, while the lower end is closed by a plastic  
6 sealing disc 36. A resilient grommet 38 of rubber  
7 or synthetic material surrounds the lower portion of  
8 the stem 30 and is held in place by the sealing disc  
9 36 and a retaining collar 31 formed on the outside  
10 of the stem 30.

11  
12 The grommet 38 is sealed to a mounting cup 44 of  
13 metal. The mounting cup has an outer flange 48  
14 which is adapted to fit around a rolled flange 13  
15 which extends around the opening of the container  
16 12. When the stem 30 is tilted, the sealing disc 36  
17 is pushed away from the grommet 38 on one side, and  
18 material in the container 12 is free to pass between  
19 the sealing disc 36 and grommet 38, through the  
20 apertures 32, along the inner bore of the stem 30  
21 and through the open end 34 of the stem. When the  
22 stem is released, the resilience of the grommet 38  
23 pushes the stem back to the position shown in Fig 2.

24  
25 The nozzle assembly 16 includes a nozzle 22 at its  
26 upper end. In the example the nozzle 22 is angled,  
27 but it may be straight or positioned at a different  
28 angle. In the example the lever 18 is integrally  
29 formed with the nozzle assembly 16 as a one-piece  
30 plastic moulding, but it may be attached separately.  
31 The nozzle assembly sealingly engages at its lower  
32 end with the valve stem. This can be by a screw

1 thread or snap fit or any other appropriate  
2 engagement means. The nozzle 22 may be provided  
3 with a removable nozzle cap (not shown).

4

5 The collar 20 is shown in more detail in Fig. 1.

6 The collar 20 is a ring shaped collar formed of  
7 moulded plastic and includes a circular groove 50 in  
8 its lower face which is adapted to snap fit over the  
9 rolled flange 13 of the container and/or the outer  
10 flange 48 of the mounting cup 44.

11

12 The collar 20 is a variable spacing means and has a  
13 number of spacer portions 52, 54, 56, each of  
14 different height, arranged about the collar. In use  
15 the lever 18 is rotated until it extends over the  
16 required spacer portion. The user then depresses  
17 the lever until the underside 60 of the lever 18  
18 contacts the top of the spacer portion, at which  
19 point the lever 18 is at the limit of its travel.  
20 By positioning the lever over a different spacer  
21 portion 52, 54, 56 the user selects a different  
22 limit of travel and therefore a different flow  
23 setting of the valve. Fig 3 shows the lever 18  
24 fully depressed over spacer portion 56, with the  
25 valve 14 opened to an intermediate flow setting.  
26 Fig 4 shows the lever 18 fully depressed over spacer  
27 portion 52, with the valve 14 opened to a fully open  
28 flow setting.

29

30 To dispense product, a user presses down on the  
31 handle 62 of the lever, moving it from the primed  
32 position shown in Fig 2 towards the body of the

1 container 12 to adopt the dispensing position shown  
2 in Fig 3 or 4. Because there is a predetermined  
3 valve position associated with each dispensing  
4 position, product is urged to flow, by virtue of the  
5 internal pressurisation of the pack, at a constant  
6 predetermined rate through the ports 32 and up  
7 through the valve stem 30 and out through the nozzle  
8 22.

9  
10 To stop dispensing, the user simply releases the  
11 handle 62. This closes the valve by allowing the  
12 valve stem 30 to tilt back to the position shown in  
13 Fig 2 and close access through the ports 32.

14  
15 The collar 20 may include a further spacer portion  
16 (not shown) which is higher than the other spacer  
17 portions 52, 54, 56 and which extends to the  
18 underside 60 of the lever 18. The lever could then  
19 be rotated to extend over the higher spacer portion  
20 to prevent travel of the lever and effectively lock  
21 the valve in a closed position. If required the  
22 collar may include a corresponding projection  
23 diametrically opposite to prevent the lever being  
24 pivoted in the opposite direction when the lever is  
25 in the "locked" position.

26  
27 Figs 5 to 7 show a further embodiment of a valve  
28 assembly 10' according to the invention. The  
29 container 12, valve 14, nozzle assembly 16 and lever  
30 18 are the same as those described above with  
31 reference to Figs 2 to 4, and so are not described  
32 further.



1

2 In this embodiment the variable spacer means is a  
3 ring-shaped collar 80 with a radial slot (not shown)  
4 adapted to clip around the shaft of the nozzle  
5 assembly 16 beneath the lever 18. In the  
6 illustrated embodiment of Figs 6 and 7 the collar  
7 has two spacer portions 82, 84, although the number  
8 of spacer portions can be varied. In use the lever  
9 18 or collar 80 is rotated until the lever 18  
10 extends over the required spacer portion 82, 84.

11 The user then depresses the lever until the lever 18  
12 urges the spacer portion into contact with the  
13 flange 13 of the container 12, at which point the  
14 lever 18 is at the limit of its travel. By  
15 positioning the lever over a different spacer  
16 portion 82, 84 the user selects a different limit of  
17 travel and therefore a different flow setting of the  
18 valve. Fig 6 shows the lever 18 fully depressed  
19 over spacer portion 82, with the valve 14 opened to  
20 an intermediate flow setting. Fig 7 shows the lever  
21 18 fully depressed over spacer portion 84, with the  
22 valve 14 opened to a fully open flow setting.

23

24 Operation is as described for the first embodiment.  
25 The collar 80 may include a further spacer portion  
26 (not shown) which is deeper than the other spacer  
27 portions 82, 84 and which extends over height H as  
28 shown in Fig 5 when the lever 18 is in the at-rest  
29 position. The lever 18 or collar 80 could then be  
30 rotated to prevent travel of the lever and  
31 effectively lock the valve in a closed position. If  
32 required the collar 80 may include a corresponding

1 projection diametrically opposite to prevent the  
2 lever being pivoted in the opposite direction when  
3 the lever is in the "locked" position.  
4

5 Figs 8 to 10 show a further embodiment of a valve  
6 assembly 10" according to the invention. The  
7 container 12 and valve 14 are the same as those  
8 described above with reference to Figs 2 to 4, and  
9 so are not described further.  
10

11 In this embodiment nozzle assembly 90 acts as a  
12 lever, and the product is dispensed by displacing  
13 the nozzle assembly 90 laterally. The variable  
14 spacer means is a collar 92 which has a top plate 94  
15 and a sleeve 96 which extends down from the top  
16 plate to form a flush connection with the wall of  
17 the container 12. The collar 92 includes an  
18 internal tubular wall 98 which positively engages  
19 with the rolled flange 13 which extends around the  
20 opening of the container 12.  
21

22 The top plate 94 of the collar 92 has three recessed  
23 portions 100, 102, 104. The recessed portion 100 is  
24 the shallowest of the three. When the nozzle  
25 assembly 90 is operated in the direction of the  
26 shallowest recessed portion 100 the tilt valve 14  
27 can only partially open, so that product flows from  
28 the container 12 at a slow flow rate. When the  
29 nozzle assembly 90 is operated in the direction of  
30 the middle recessed portion 102 the tilt valve 14  
31 can open to a greater extent, so that product flows  
32 from the container 12 at a medium flow rate. When

1 the nozzle assembly 90 is operated in the direction  
2 of the deepest recessed portion 104 the tilt valve  
3 14 can open fully, so that product flows from the  
4 container 12 at the maximum flow rate.

5  
6 Markings 106 can be provided on the collar 92 to  
7 indicate the flow rate associated with each recessed  
8 portion 100, 102, 104. The top plate 94 is provided  
9 with a flange 108 of the same diameter as the rolled  
10 flange 13 of the container 12, so that a cap 110  
11 adapted to fit on the rolled flange 13 can also fit  
12 on the collar 92.

13  
14 Modifications and improvements may be made to the  
15 foregoing without departing from the scope of the  
16 invention. In particular the step-like spacer  
17 portions 52, 54, 56, 82, 84 or recesses 100, 102,  
18 104 of the illustrated embodiments may be replaced  
19 by cam surfaces which allow quasi-infinite  
20 adjustment of the maximum travel of the lever. The  
21 variable spacer means 20, 80, 92 may have shapes and  
22 forms other than those illustrated. The shape and  
23 form of the lever 18 and nozzle assembly 90 may be  
24 varied. The collar 82, 84 may be rotatably or  
25 slidably fixed to the underside 80 of the lever.  
26 The spacer portions may be adapted to bear on a part  
27 of the container 12 or mounting cap 44 other than  
28 the rolled flange 13. The spacer portions 52, 54,  
29 56, 82, 84 may be provided with locating grooves or  
30 other means to encourage engagement with the lever  
31 18 at particular relative rotational positions.

FIG. 1

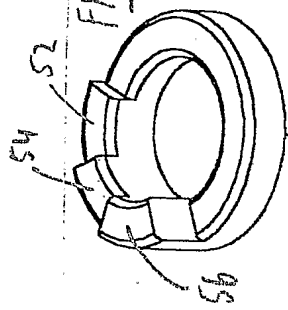


FIG. 2

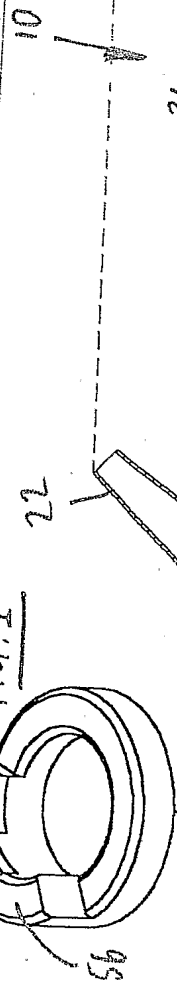


FIG. 3

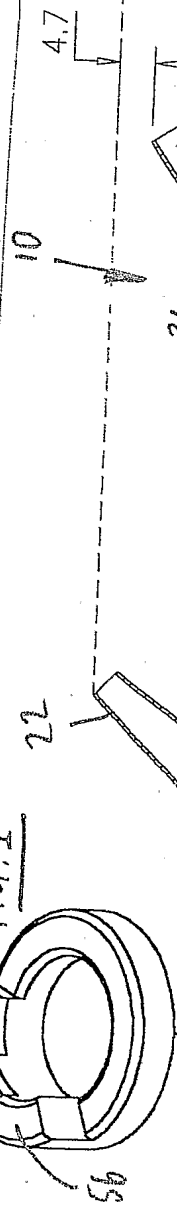


FIG. 4

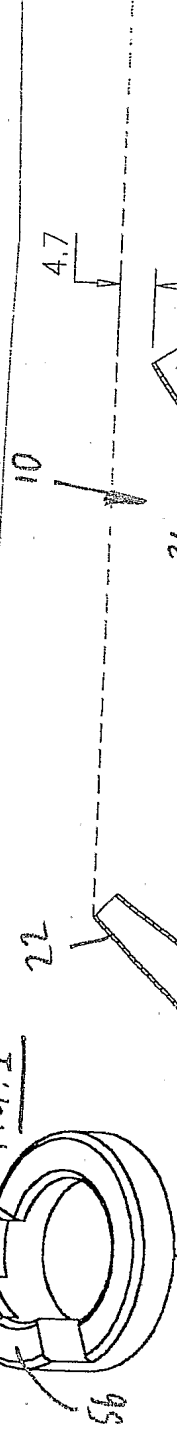


FIG. 5

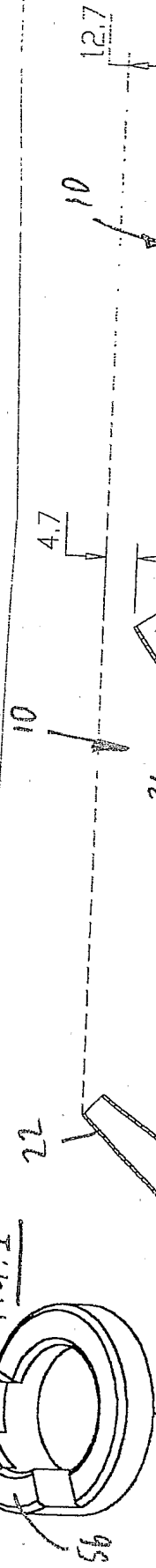


FIG. 6

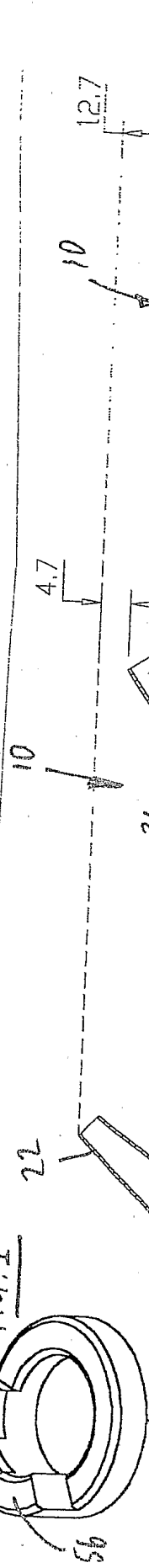


FIG. 7

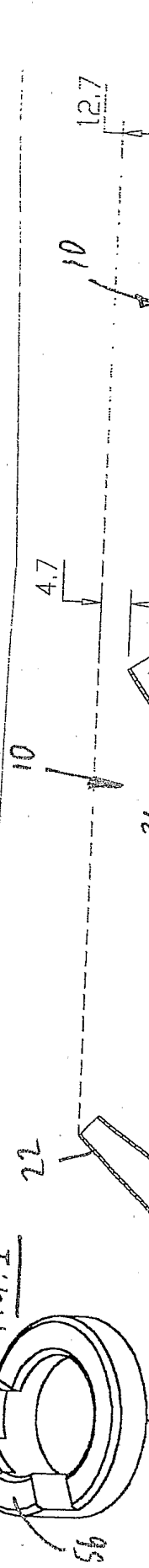


FIG. 8

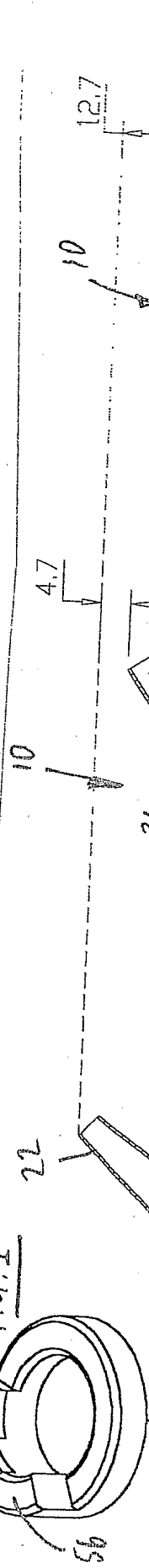


FIG. 9

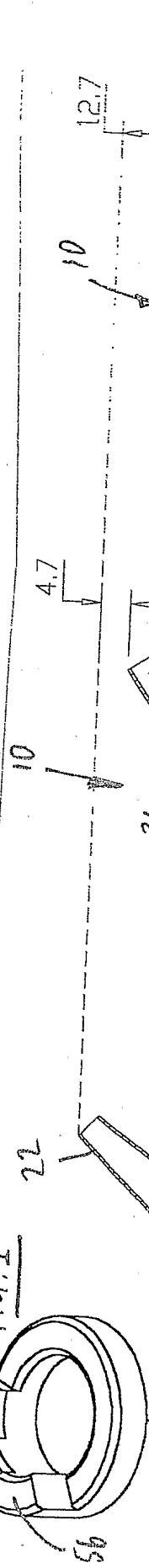


FIG. 10

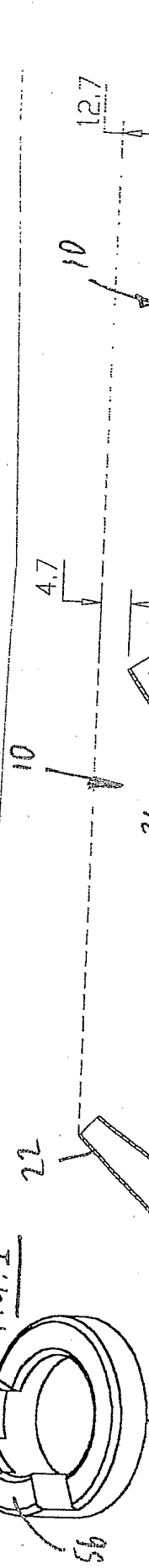


FIG. 11

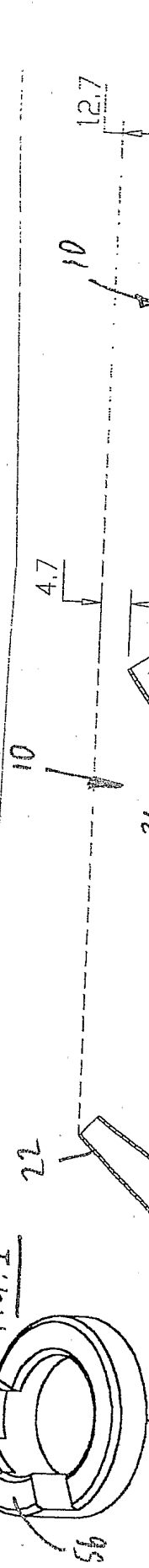


FIG. 12

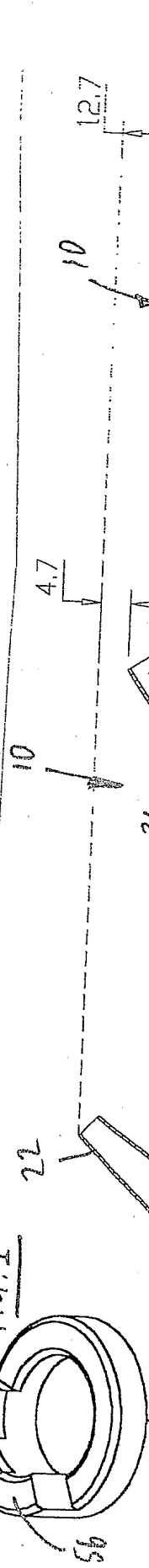


FIG. 13

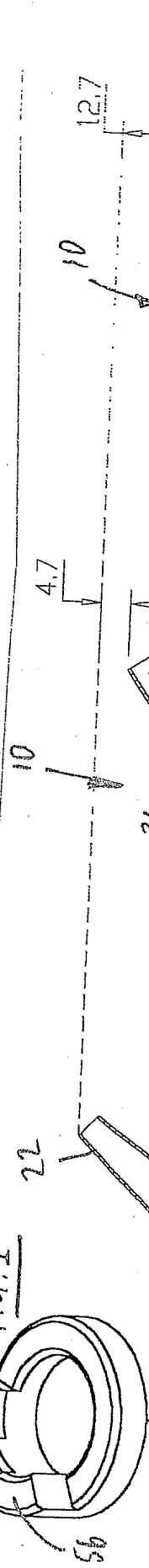


FIG. 14

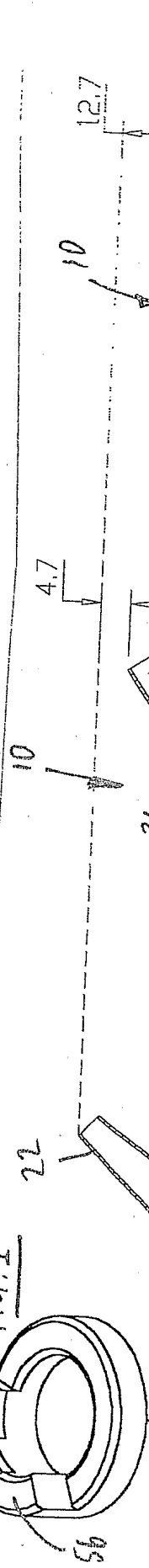


FIG. 15

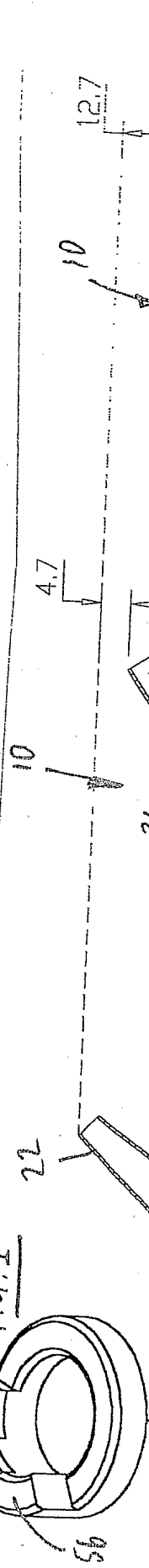


FIG. 16

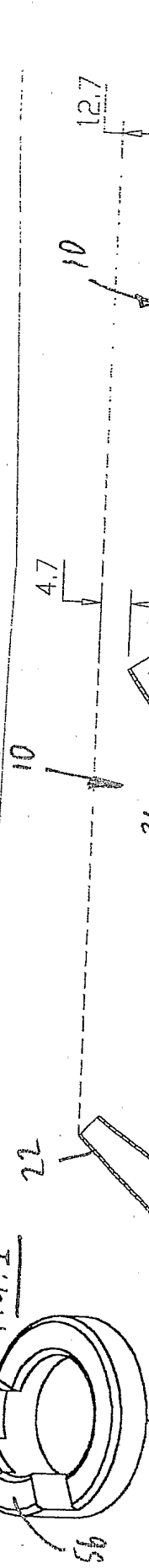


FIG. 17

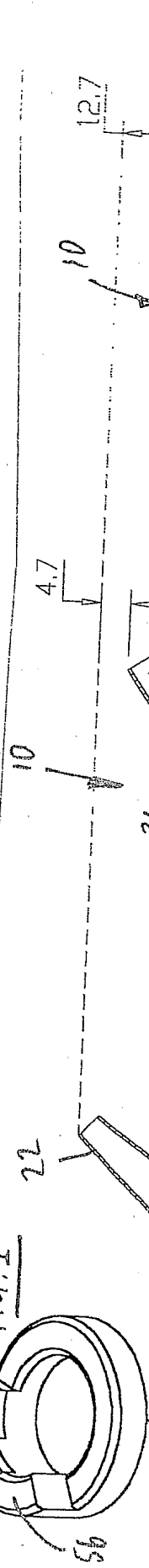


FIG. 18

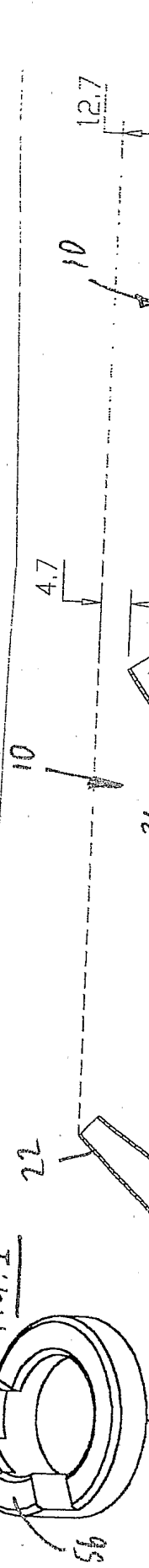


FIG. 19

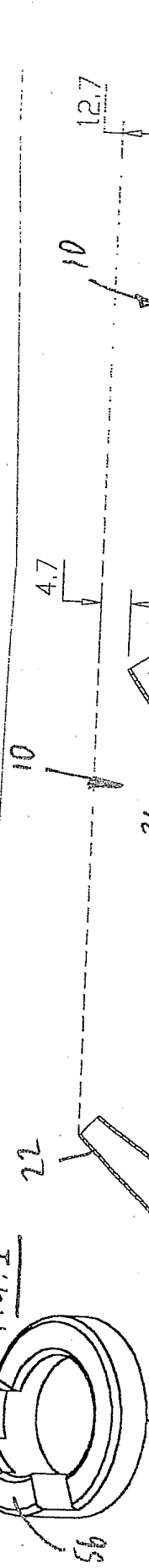


FIG. 20

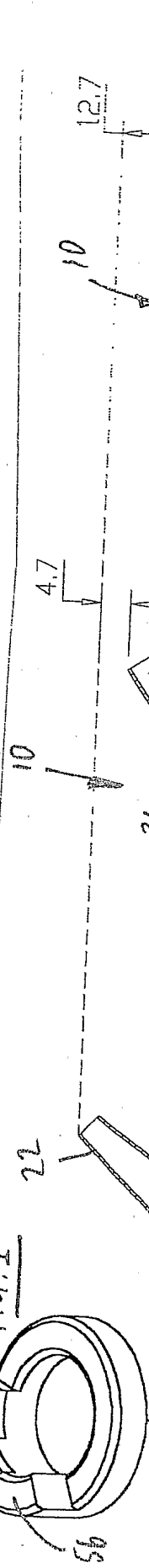


FIG. 21

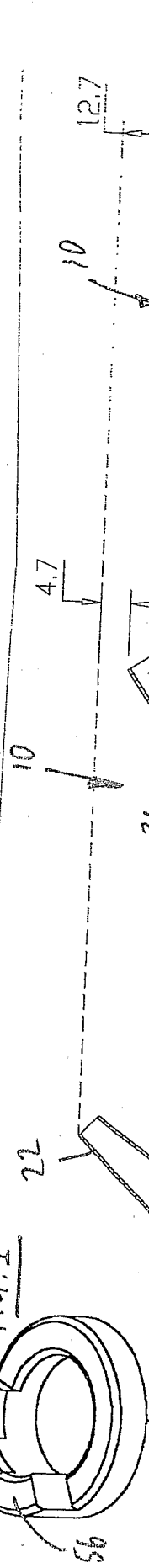


FIG. 22

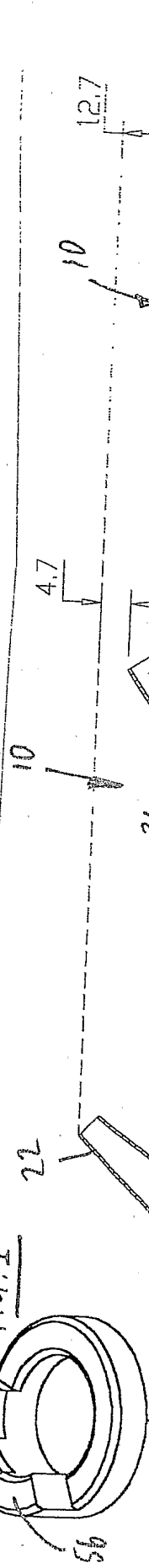


FIG. 23

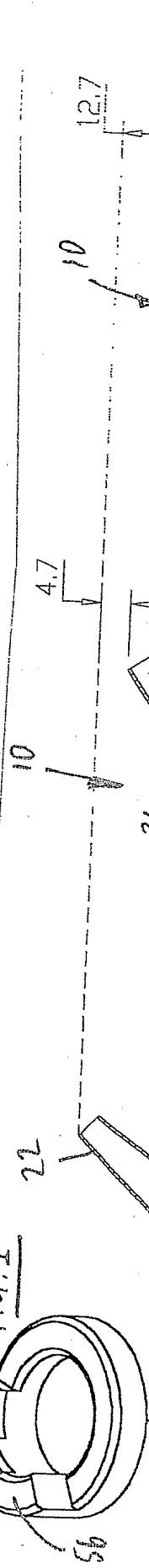


FIG. 24

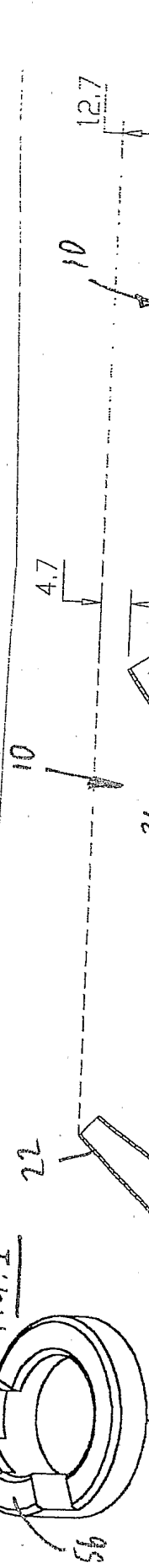


FIG. 25

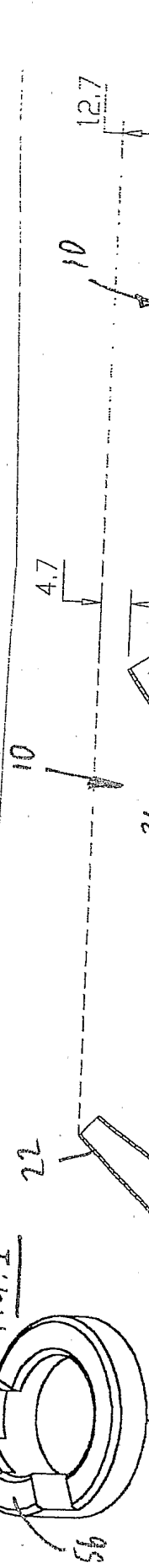


FIG. 26

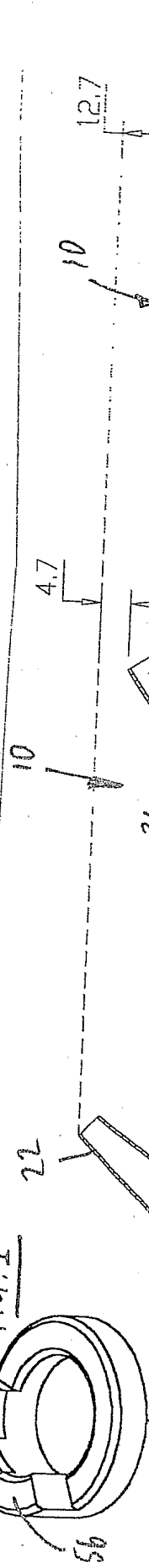


FIG. 27

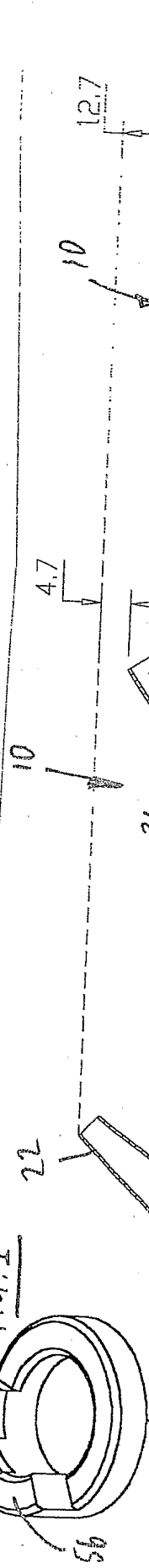


FIG. 28

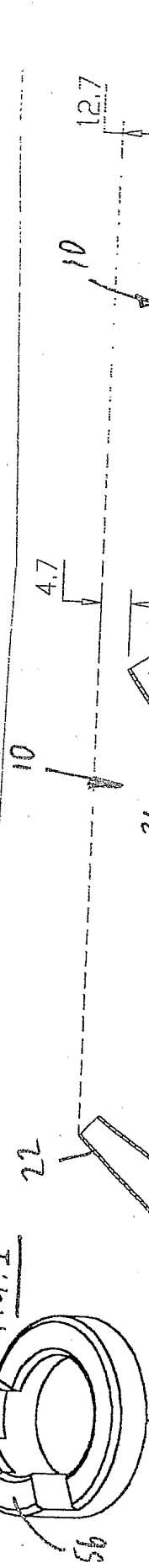


FIG. 29

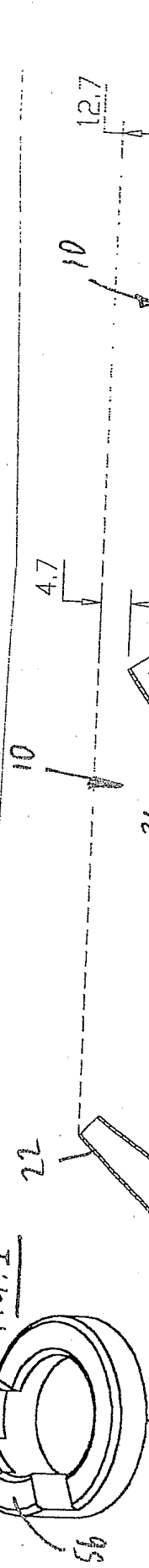


FIG. 30

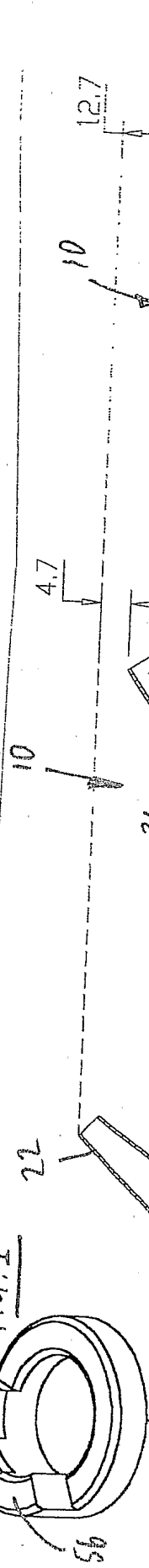


FIG. 31

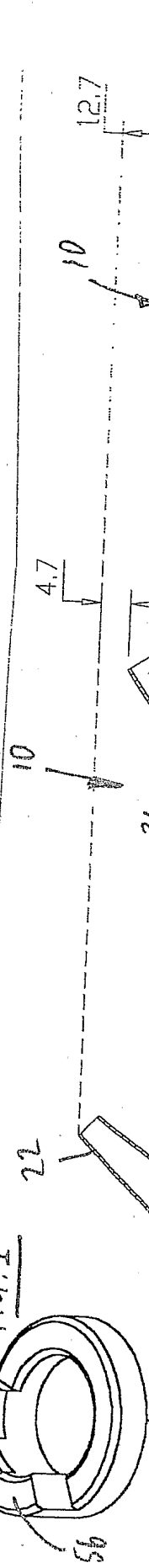


FIG. 32

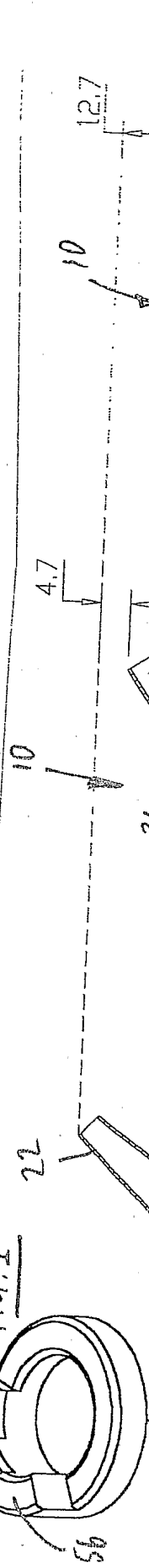


FIG. 33

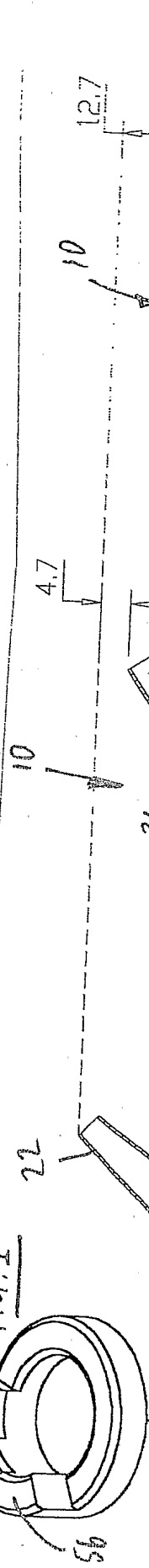


FIG. 34

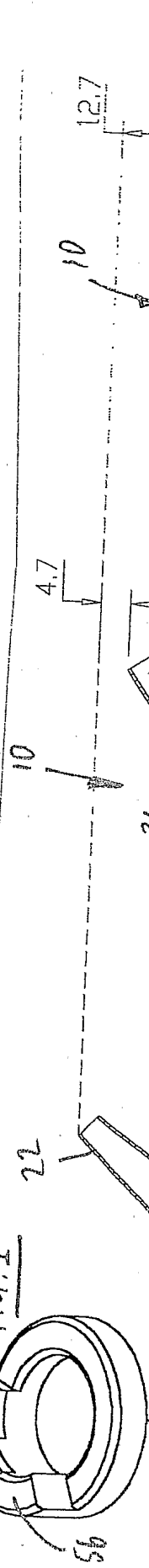


FIG. 35

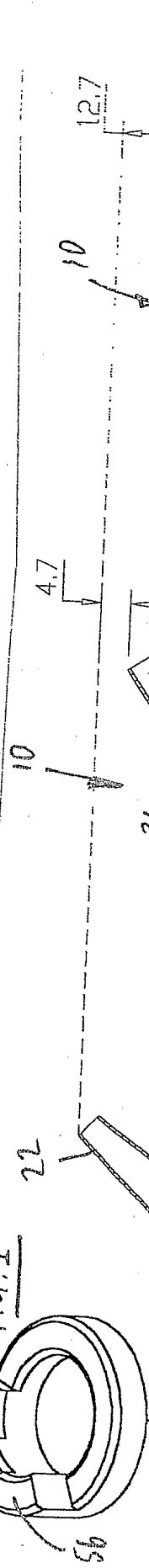


FIG. 36

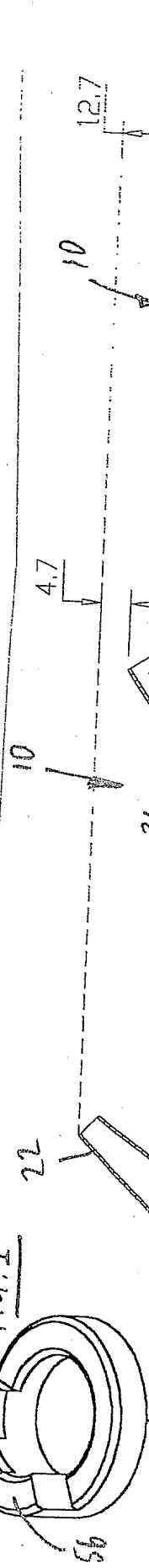


FIG. 37

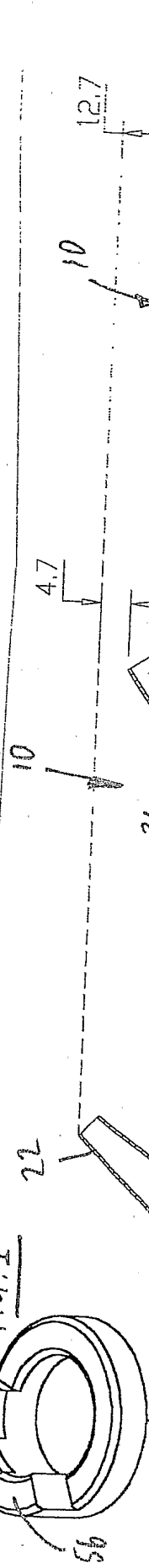


FIG. 38

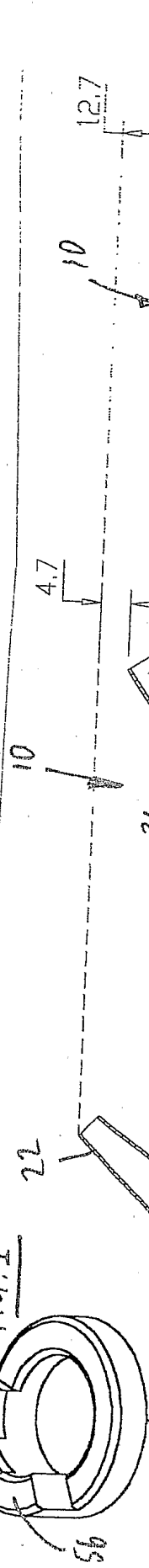


FIG. 39

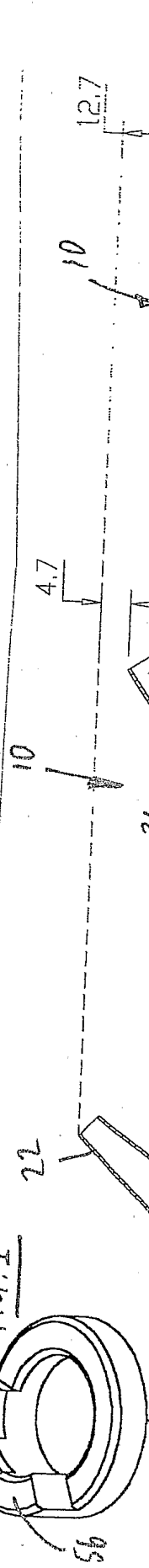


FIG. 40

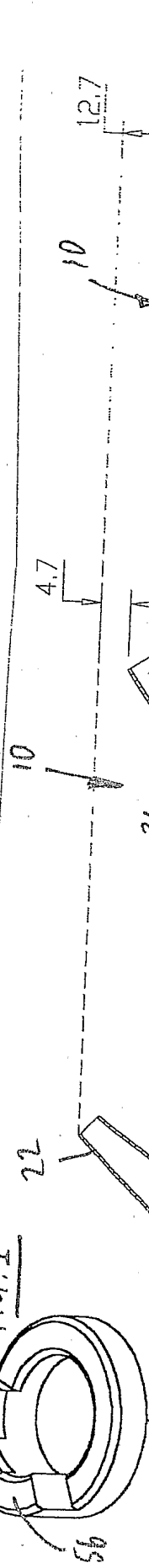


FIG. 41

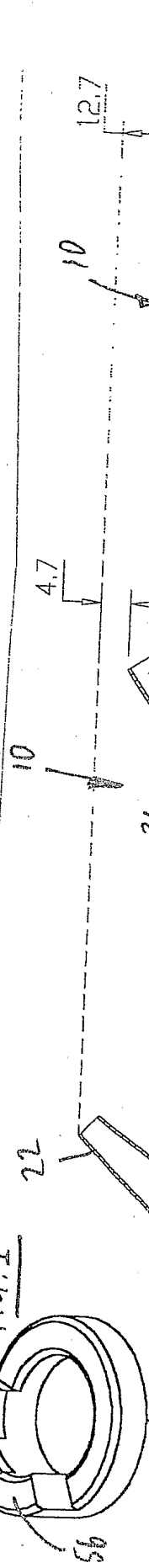


FIG. 42

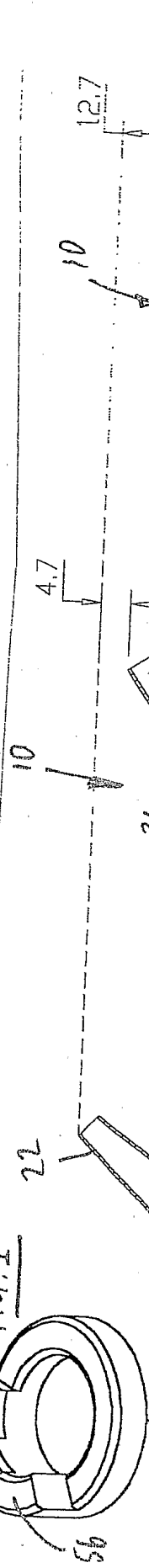


FIG. 43

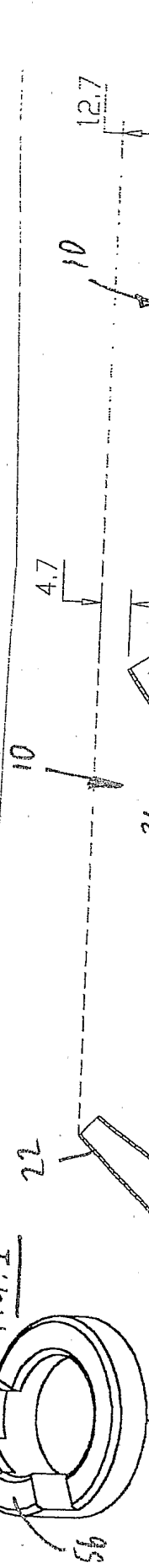


FIG. 44

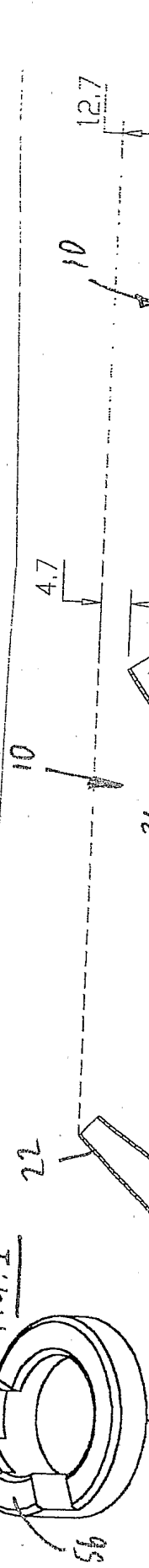


FIG. 45

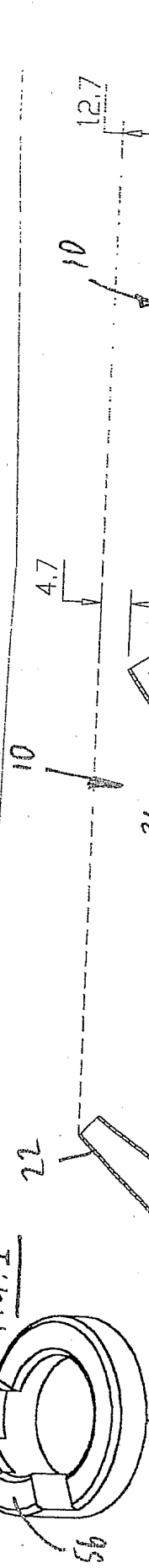


FIG. 46

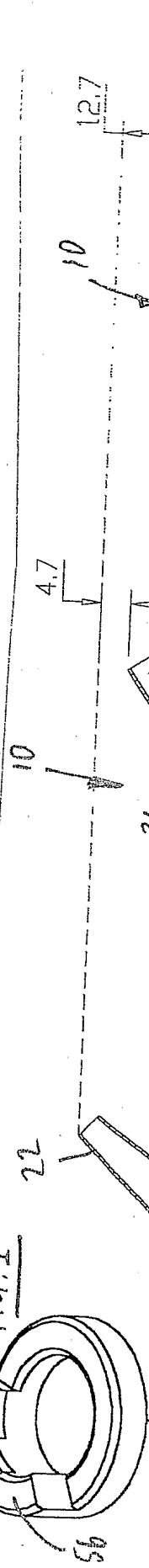


FIG. 47

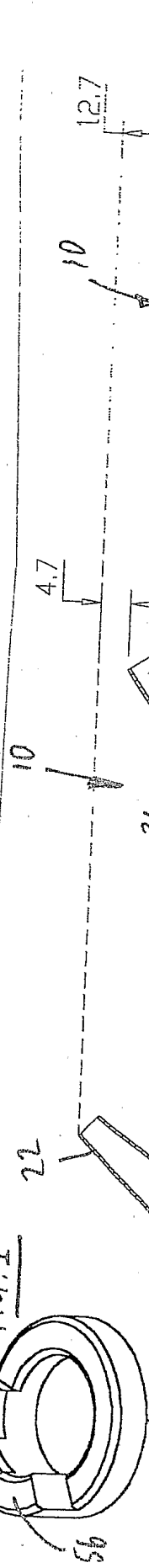
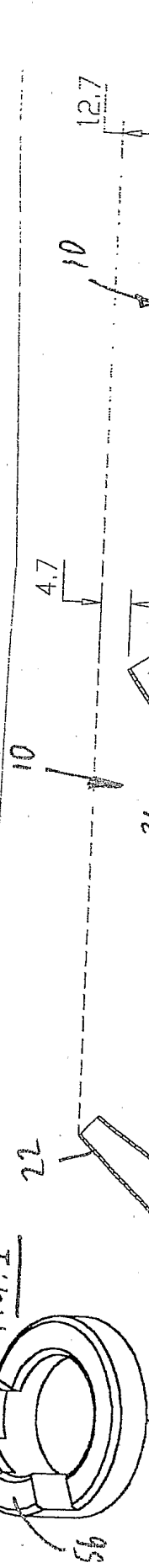
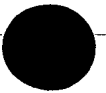
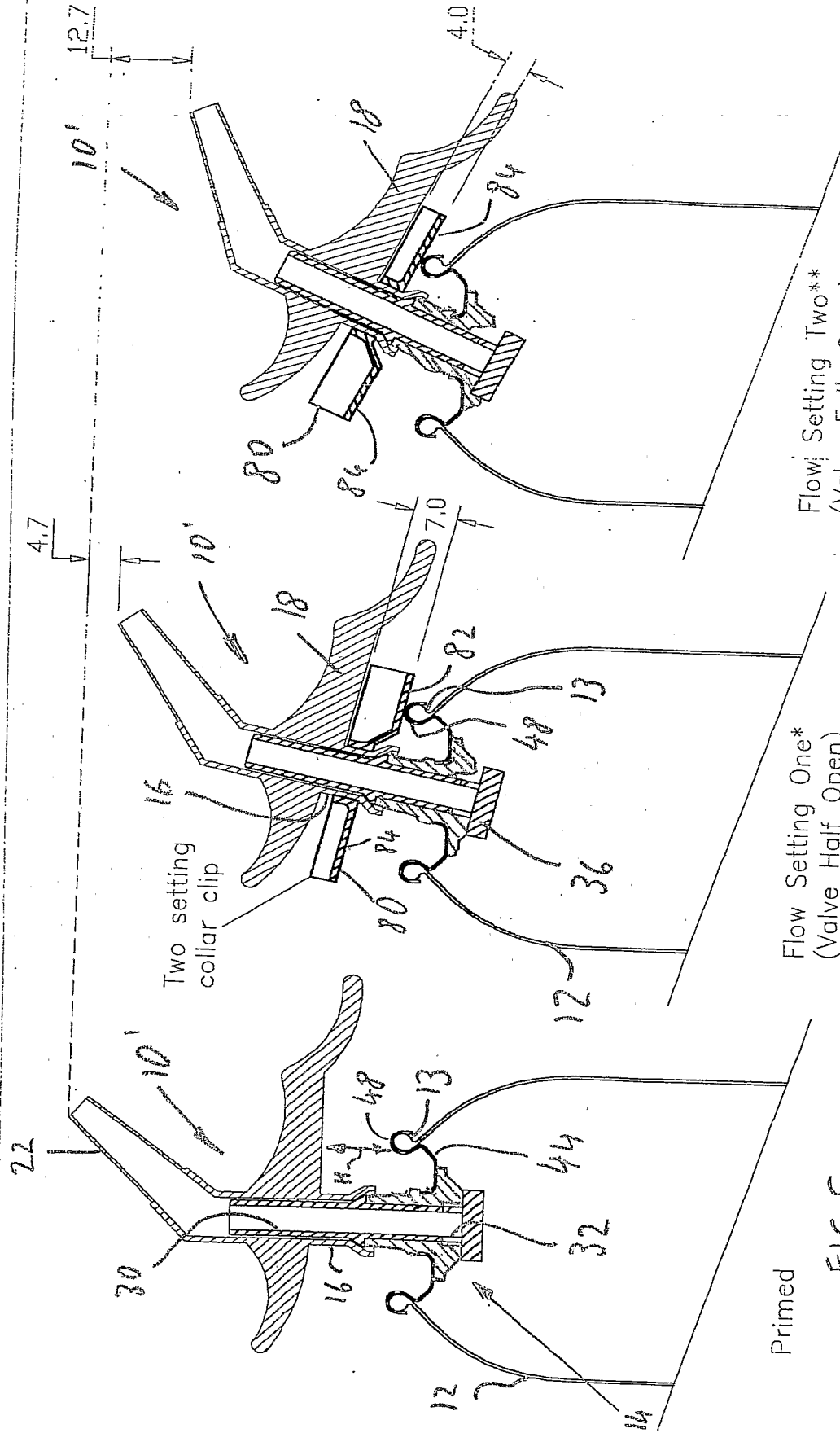


FIG. 48







Primed

FIG. 5

Flow Setting One\*  
(Valve Half Open)

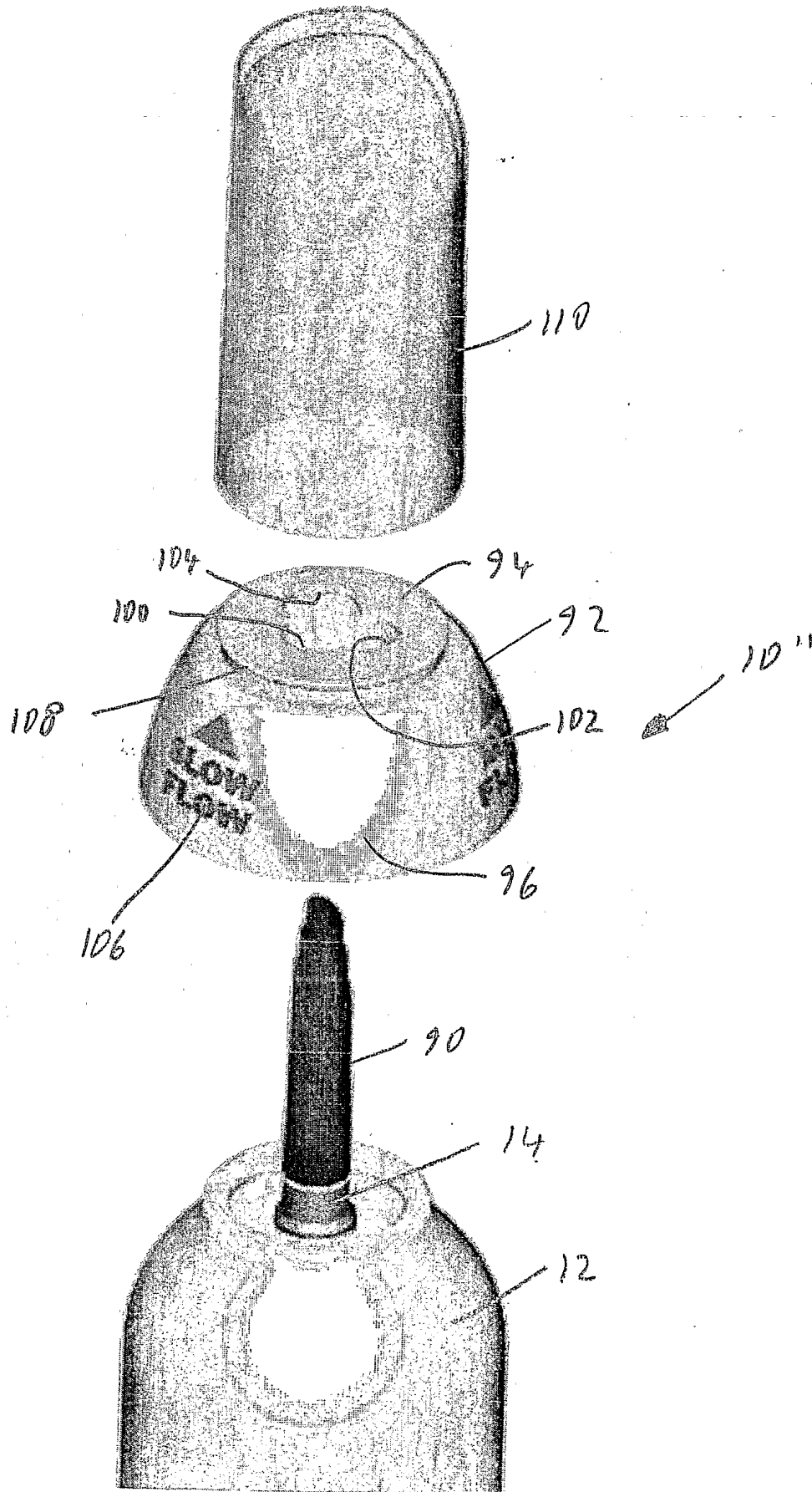
FIG. 6

Flow Setting Two\*\*  
(Valve Fully Open)

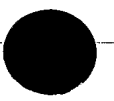
FIG. 7



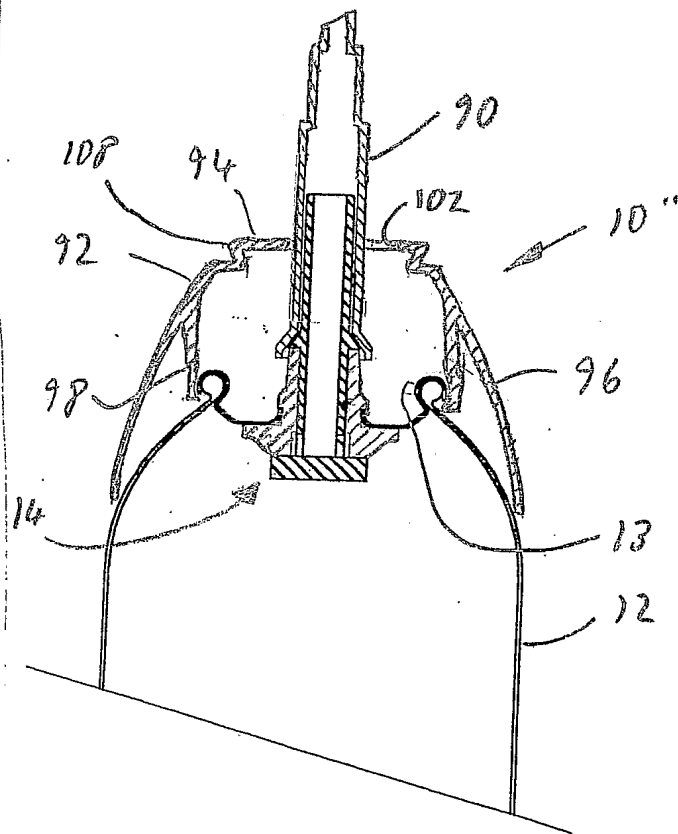
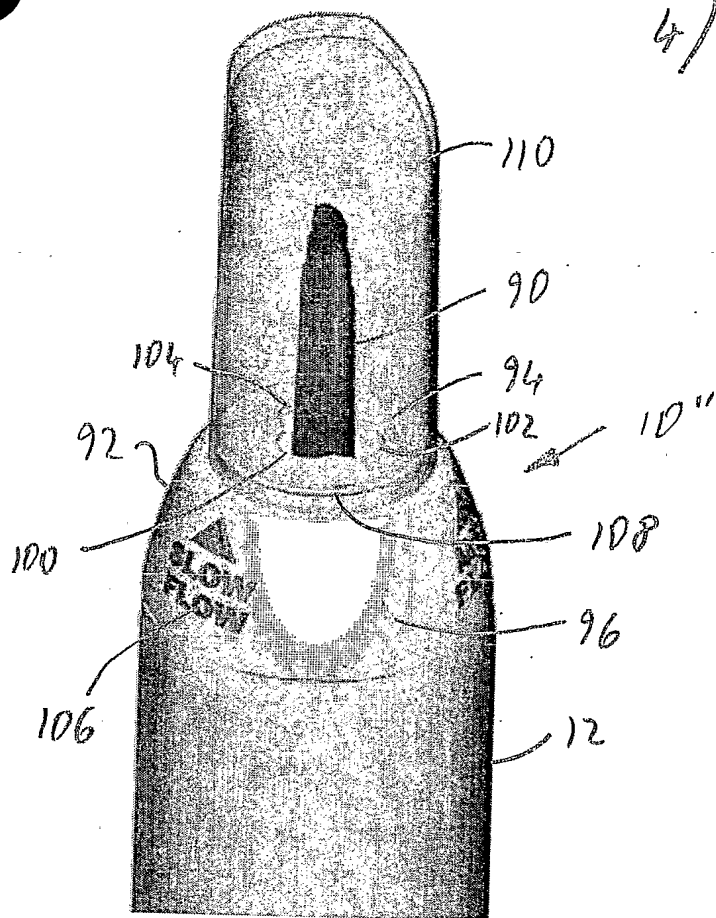
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